
Asthma and the Environment

A Story of Children and Indoor Air...

In 2003, the Snohomish Health District's Partners in Child Care received a grant from the Environmental Protection Agency (EPA) to reduce health affects (including asthma) caused by poor air quality in child care.

They conducted environmental assessments at 44 child care facilities (humidity, temperature, carbon monoxide, carbon dioxide, and particulate matter testing). They also interviewed each childcare provider, provided them with information on the testing results, and gave them educational materials and supplies.

The most common recommendations were: reduce chemical use; monitor and reduce moisture in the air, increase fresh air exchange by opening windows; review the educational materials provided; and develop care plans for children with respiratory health problems.

A six month follow up was conducted at each of the sites and found that many of the facilities had made changes which resulted in better air quality. Some providers opened the windows more often resulting in a drop in carbon dioxide levels and relative humidity. Of the home child care providers, 92% stated they now use fewer chemicals for cleaning and almost all said they would continue to use the less toxic alternatives provided.

Improving environments for children with asthma can be done inexpensively when child care providers receive education that builds their knowledge and skills.



Allergens

Substances that can cause an allergic reaction, usually absorbed through the skin, nasal passages, lungs or digestive tract.

Irritants

Substances that can cause irritation of the skin, eyes, or respiratory system. Effects may be acute from a single high level exposure, or chronic from repeated low-level exposures.

Triggers

A factor that may bring on or increase the signs and symptoms of asthma.

Asthma and the Environment

Environmental exposures play an important role in the development and management of asthma. The main factors responsible for triggering asthma attacks (exacerbations) and persistent symptoms are exposure to allergens, irritants and viral respiratory infections. Some allergens (substances that can cause an allergic reaction) are common biological agents such as animal dander, dust mites, cockroaches, and molds. Other common respiratory irritants include diesel exhaust, fumes from household and industrial cleaning products, solvents, new building and finishing materials, secondhand smoke and air pollution, including ozone and fine particles.

Environmental pollutants contribution to the incidence, prevalence, mortality, and costs of pediatric asthma in American children is estimated at \$2 billion.¹ Annual expenditures for health and lost productivity due to asthma were \$14 billion in 2002.² The estimated cost of treating asthma in those under 18 is \$3.2 billion per year.³

Indirect costs as a result of asthma, such as school days lost, decreased performance in school, loss of work, housekeeping, and mortality, have annual costs of about \$6 billion in the US and \$166 million in Washington. Nationally the estimated 10 million school days children miss each year alone result in \$1 billion in lost productivity as parents miss work to care for their children. This does not include the cost of lost productivity from adults with asthma who miss work.⁴ See *The Burden of Asthma in Washington State* for more information on economic costs.

The disabilities and risk of death associated with asthma are largely preventable with proper medical attention and reductions in environmental triggers.⁵ Parents, community leaders and organizations from the public, private and non-profit sectors can play important roles in reducing asthma triggers (allergens or irritants) where people live, learn, work and play. Supportive environments for people with asthma are environments enhanced for all people.

Exposures to allergens or irritants can occur in both indoor and outdoor settings. In Washington State, exposure to allergenic or irritant agents is relatively common due to geographical concentrations of air pollutants, proximity to industrial emissions and individual behaviors. Western Washington has a damp climate where mold can easily grow. Faulty building construction, "deferred maintenance," and/or poor fresh air ventilation lead to frequent complaints about indoor mold problems. Extensive trucking and marine vessel transport occurs in this region contributing to diesel exhaust concerns.

In Eastern Washington, agricultural burning is a common practice and forest fires can also occur anywhere in the state when drought conditions exist. Even with a dryer climate, mold related issues also occur in Eastern Washington due to water intrusion or ventilation problems. Throughout Washington, many residents use wood stoves or fireplaces to heat their homes. Volcanic activity is an additional episodic source of air pollution.

- 1 Landrigan PJ., Schechter CB., et al. (2002). Environmental Pollutants and Disease in American Children: Estimates of Morbidity, Mortality, and Costs for Lead Poisoning, Asthma, Cancer, and Developmental Disabilities. *Environmental Health Perspectives*. Volume 110, No. 7.
- 2 National Heart, Lung and Blood Institute. (2002) *Morbidity & Mortality: 2002 Chart Book on Cardiovascular, Lung and Blood Diseases*. P: 17.
- 3 Weiss KB., Sullivan SD., Lytle CS. (2002). Trends in the cost for asthma in the United States, 1985-1999. *Journal of Allergy & Clinical Immunology*. 106: 493-499
- 4 U.S. Department of Health and Human Services. (2000). *Healthy People 2010: Understanding and Improving Health*. 2nd ed. Washington, DC: U.S. Government Printing Office.
- 5 Peters JM., Avol E., Berhane K., Gauderman WJ., Gilliland F., et al. (2004). *Epidemiologic Investigation to Identify Chronic Effects of Ambient Air Pollutants in Southern California*. California Air Resources Board.

Table 1: Common Indoor and Outdoor Agents Precipitating Asthma

Agent	Major Sources
Indoor Agents	
Dust mites	Mattresses, bed linens, stuffed fabric toys, feather pillows, carpeting
Animal allergens (dander, saliva, urine)	Cats, dogs, rodents, birds
Cockroaches	Moisture and availability of organic food sources.
Secondhand Smoke	Cigarettes, cigars, other tobacco products
Molds	Excess moisture due to plumbing leaks, roof, walls, window leaks, floods, lack of foundation drainage resulting in damp basements, lack of ventilation
Nitrogen Oxides	Room-vented gas or oil-fired space heaters, gas-fueled cooking stoves and cook tops Sprays, deodorizers, pesticides, mold, solvents
Odors	
Volatile organic compounds	Pesticides, sealants, adhesives, insulation materials, combustion product, molds
Ozone (O ₃)	Laminators and copiers, printers, some air cleaners
Outdoor Irritants	
Ozone (O ₃)	Hydrocarbon vapors and nitrogen oxides from combustion (motor vehicles, boats, lawnmowers, power plants) that react in sunlight
Sulfur dioxide (SO ₂)	Fossil fuels (power plants), industrial sources; sulfur-containing motor fuels
Fine particulate	Diesel exhaust, gasoline engine exhaust, wood stove and fireplace burning and agricultural burning

Adapted from: Etzel, R. Balk, S., (Eds). (1999). *Handbook of Pediatric Environmental Health*. 1st ed., American Academy of Pediatrics.

Outdoor Air Quality

Poor air quality in many U.S. cities results from a variety of common activities such as driving cars and trucks, burning wood, coal, oil and other fossil fuels, and degreasing and painting operations. Volcanic ash, smoke from forest fires and agricultural burning also contribute to air pollution. Poor outdoor air quality that contains easily inhaled small particles and ozone can cause or worsen lung-related diseases, including emphysema, chronic bronchitis and asthma.⁶ Approximately 25 percent of children in the United States live in areas that exceed the Federal Government's standard for ozone.⁷ Washington State currently has four areas in maintenance status for ozone.

Despite improvements brought by tighter regulation of air pollution, increasingly widespread diesel engine use and increases in number of vehicle miles driven now represent a significant percentage of fine particle concentrations in Washington State. Generation of microscopic particles that penetrate deep into human lungs and enter the circulatory system represent a threat to respiratory and cardiac health. These particles contain chemicals that

Particulate Matter (PM)

Particulate matter is the general term used for a mixture of solid particles and liquid droplets suspended in the air. It includes aerosols, smoke, fumes, dust, ash, endotoxin, mold products, and pollen.

Ozone (O₃)

Naturally formed gases that are beneficial in the layer of atmosphere but when close to the ground can irritate the respiratory tract, cause chest pain or persistent cough, affect the ability to inhale deeply, and increase susceptibility to lung infection.

Air Quality Index (AQI)

Submitted daily by the EPA, this reports on how clean the air is by measuring ground level ozone, particle matter, carbon monoxide, sulfur dioxide and nitrogen dioxide.

6 Busse WW., Gern JE., Dick EC. (1997). The Role of Respiratory Viruses in Asthma. *Ciba Foundation Symposium* 206: 208-213.

7 Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency (EPA). (1997). *National Air Quality and Emissions Report, 1997*. CPA Pub. No. EPA 454/R-98-016. Research Triangle Park, NC: EPA, 1998.



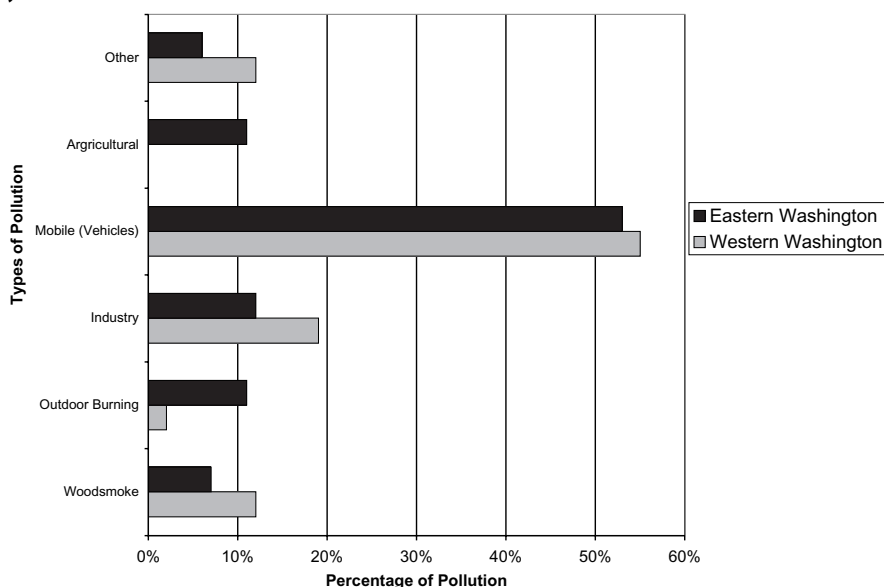
cause oxidative stress in human cells, a process that leads to cell damage and an inflammatory response from the immune system.^{8,9,10} Such inflammation appears to be an important step leading to respiratory problems such as allergic rhinitis, sinusitis and asthma.

Diesel Particles:

- Are themselves allergenic
- Worsen allergic responses to allergens such as pollens
- Create asthma symptoms in people affected by these conditions which can cause damage to the lungs
- May increase the risk of developing allergies or asthma at initial exposure.¹¹

Washington's outdoor air quality is generally considered moderate to good, and its air quality has improved over the last ten years. However, the state's growing population and continued reliance on private motor vehicles threatens air quality. The main sources of air pollution in Washington are, respectively, motor vehicles, wood stoves and fireplaces, and outdoor burning. Other sources include lawnmowers, recreational motorboats and recreational vehicles, aircraft, trains and ships.

Figure 2: Air Pollution in Washington and Eastern Washington, by Pollutions, 2002



Washington State Department of Ecology.

The primary cause of poor air quality in Washington is motor vehicle exhaust containing many pollutants. In addition, motor vehicles are major contributors to ground-level ozone. Particulate matter (PM) is perhaps the most significant health concern related to poor air quality.¹³ Particulate matter is composed of both coarse and fine materials. Of greatest concern is the particulate matter of less than 2.5 microns (PM_{2.5}) in size that can travel deep into the respiratory system (a micron is defined as a one millionth of a meter in length). Outdoor burning and agriculture burning/practices have a somewhat greater impact on air quality in Eastern Washington than in Western Washington while industry and woodstove emissions have a somewhat greater impact in Western Washington than in Eastern Washington.¹⁴

A recent case-control study nested within a large population-based cohort study of California children from twelve communities indicates that environmental exposures before age five are risk factors for the early-onset persistent asthma.¹⁵ Exposures include wood or oil smoke, soot or exhaust, pesticides and farm crops, farm dust, or farm animals. New onset of asthma has also

- 8 Fahy O., Hammad H., Sénéchal S., Pestel J., et al. (2000). Synergistic Effect of Diesel Organic Extracts and Allergen Der p 1 on the Release of Chemokines by Peripheral Blood Mononuclear Cells from Allergic Subjects. *Am J Respir Cell Mol Biol* 23: 247-254.
- 9 Fujieda S., Diaz-Sanchez D., Saxon A. (1998). Combined Nasal Challenge with Diesel Exhaust Particles and Allergen Induces *in vivo* IgE Isotype Switching. *Am J Respir Cell Mol Biol* 19: 507-512.
- 10 Pandya RJ., Solomon G., Kinner A., Balmes JR. (2002). Diesel Exhaust and Asthma: Hypotheses and Molecular Mechanisms of Action. *Environmental Health Perspectives* 110(sup 1): 103-112.
- 11 Riedl M., Diaz-Sanchez D., (2005). Biology of Diesel Exhaust Effects on Respiratory Function. *Journal of Allergy and Clinical Immunology*. February; 115(2):221-8; quiz.
- 12 Washington State Department of Ecology. (2001). *Air Lines, Let's Keep it Clean*. May. <http://www.ecy.wa.gov/pubs/0102002.pdf>
- 13 Dilley J., Pizacani B., Macdonald S., Bardin J. (2005). *The Burden of Asthma in Washington State*. Olympia, WA: Washington State Department of Health. Pg: 94
- 14 Dilley J., Pizacani B., Macdonald S., Bardin J. (2005). *The Burden of Asthma in Washington State*. Olympia, WA: Washington State Department of Health. Pg: 88
- 15 Salam MT., Li Y-F., Langholz B., Gilliland FD. (2004). Early-life Environmental Risk Factors for Asthma: Findings from the Children's Health Study. *Environmental Health Perspective*. 112(6): 760-765

been associated with heavy exercise of children living in communities with high concentrations of ozone.¹⁶ Development of chronic bronchitis in Southern California children with asthma was noted to be related to levels of PM10 and PM2.5, acid aerosols and nitrogen dioxide.¹⁷

Despite progress in achieving clean outdoor air in Washington, specific geographic areas remain at continued risk for poor air quality. For people with severe asthma it may be important to monitor air quality routinely. The air quality index is a good source for information on fine particulate matter and ground level ozone levels. The air quality index is maintained by the Department of Ecology and regional air quality agencies.

Home Indoor Air Quality

Homes contain a wide variety of environmental allergy and asthma triggers. Information about environmental asthma triggers and effective control strategies is necessary to empower residents to reduce exposures in the home. Exposure to environmental allergens or irritants (such as dust mites) has been identified as being linked to the development of asthma and to worsening asthma symptoms.¹⁸ One study showed that exposure to cockroach antigen in the first year of life is also a risk factor for the development of asthma early in life.¹⁹ Two recent studies found suggestive and limited evidence for association between damp indoor spaces and the development of asthma.²⁰ The second study, a recent six-year population-based cohort study of home dampness and mold concluded that exposure to molds increases the risk of developing asthma in children.²¹ (See Table 1 for examples of common asthma triggers.)



Dust Mites

A microscopic, often translucent arachnid that lives on skin scales in bedding, carpeting, and stuffed toys. When fragments of its feces are inhaled they can produce an allergic reaction leading to inflammation in the lung.

A Seattle study of homes of low-income children found that environmental triggers played an important role for children with asthma, particularly in those sensitized to allergens or irritants commonly found in the home environment. The researchers suggested that clinicians need to enlist the aid of parents in the management of their children's asthma. This study demonstrated that using a global approach to environmental interventions in the homes of low-income children with asthma can be easily taught and understood by families. These interventions can change behaviors related to asthma triggers, reduce many of the exposures, and improve asthma and caregiver quality of life.²²

Secondhand Smoke

Secondhand smoke is a well-documented, potent trigger for asthma. *The Burden of Asthma in Washington State* report found that even though there is conflicting evidence as to whether active smoking is a risk factor for developing asthma, researchers agree that smokers with asthma have more severe symptoms than people with asthma who do not smoke.

In Washington, current smokers (people who smoke every day or just on some days, combined) had the highest prevalence of asthma, former smokers somewhat less, and never-smokers had the lowest prevalence of current asthma.²³ Among Washington middle school-aged youth current smoking is strongly associated with asthma, but the association is not significant for high school-aged youth.²⁴

Exposure to secondhand smoke worsens asthma in a number of ways. In a variety of studies, exposed children with asthma had a more frequent need for emergency services, a greater need for medications, and a more difficult time recovering from an acute asthmatic episode.²⁵

16 McConnell R., Berhane K., Gilliland F., London SJ., et al. (2002). Asthma in Exercising Children Exposed to Ozone: A Cohort Study. *Lancet*. Feb 2;359 (9304):386-391.

17 McConnell R., Berhane K., Gilliland F., London S., et al. (1999). Air Pollution and Bronchitic Symptoms in Southern California Children with Asthma. *Environmental Health Perspective*. 107(9):757-760

18 Etzel, R.(2003). How Environmental Exposures Influence the Development and Exacerbation of Asthma, *Pediatrics* Vol. 112 No. 1 July, pp. 233-239

19 Salam MT., Li Y-F., Langholz B., Gilliland FD.(2004). Early-life Environmental Risk Factors for Asthma: Findings from the Children's Health Study. *Environmental Health Perspective*. 112(6): 760-765

20 Institute of Medicine (IOM) Committee on Damp Indoor Spaces and Health. (2004) *Damp Indoor Spaces and Health*. The National Academies Press. Washington, D.C.

21 Jaakkola JJK., Hwang BF., Jaakkola N. (2005). Home Dampness and Molds, Parental Atopy, and Asthma in Childhood: A Six-year Population-based Cohort Study. *Environmental Health Perspectives*. Volume 113, Number 3

22 Takaro TK., Krieger JW., Song L.(2004). Effect of Environmental Interventions to Reduce Exposure to Asthma Triggers in Homes of Low-income Children in Seattle. *J Expo Anal Environ Epidemiol*. 2004;14 Suppl 1:S133-43.

23 Dilley J., Pizacani B., Macdonald S., Bardin J. (2005). *The Burden of Asthma in Washington State*. Olympia, WA: Washington State Department of Health. Pg: 56.

24 Ibid., pg: 57

25 Ibid., pg: 92

Parental smoking is associated with an increased risk of asthma development in children. In two large reviews of parental smoking and school-aged children, parental smoking (by either parent) was associated with an approximate 20% to 40% increased occurrence of asthma. This relationship increased proportionately with the number of smokers in the home.²⁶ Maternal smoking appeared to have a greater association with asthma than paternal smoking; however paternal smoking alone was still a significant risk factor. Infants exposed to secondhand smoke exhibit a higher frequency of respiratory diseases, ear infections, asthma, and sudden infant death syndrome (SIDS). Between 7,500 and 15,000 infants in the United States are hospitalized each year as a result of such diseases.²⁷

The association between childhood asthma and maternal smoking during pregnancy has been inconsistent. Researchers face some difficulty in separating prenatal from postnatal exposure as most mothers who smoke during pregnancy continue to smoke after delivery. A summary review concluded that prenatal exposure may elevate risk but postnatal exposure is likely more important. Women who had successfully ceased smoking for long-term, and had no continuing household smoking, still had an 80% increased risk of asthma in their children, according to a recent study.²⁸

Secondhand smoke exposure is also linked to adult-onset asthma through both cumulative lifetime and recent exposures, with risk increasing with exposure in both the home and workplace.²⁹ In this study, exposure in the past year in the workplace increased the risk over twofold, and at home, almost fivefold. The authors also calculated that almost 50% of new cases occurring among adults exposed to secondhand smoke during the past year were attributable to that exposure.³⁰

More than 40,000 children five and under in Washington State are estimated to be exposed to Secondhand smoke in their homes. Among these children, approximately 500 new cases of asthma occurred each year as a result of the home exposure.³¹ Secondhand smoke from other people's cigarettes, pipes, or cigars is related to asthma, and is more likely to occur in low income families. In Washington, exposure to secondhand smoke was significantly associated with greater asthma prevalence among youth in 6th, 8th, and 10th grades. For example, the rate of asthma among 6th graders who were not exposed to secondhand smoke was about 6%, among youth who were exposed to secondhand smoke the occurrence of asthma was about 9%. About one in ten youth with asthma reported being exposed to secondhand smoke during the past week.³²

Smoking within a vehicle has also been identified as a risk for non-smoker passengers, in particular, children. Smoking within a confined space with limited ventilation increases the concentration of smoke that the child or passenger is breathing.

Commercial/Industrial Building Air Quality

Workplace environments contain asthma triggers and allergens that include building products, office and process equipment, chemicals, pests, and biological contaminants resulting from dampness. The health and performance of the occupants in Washington commercial buildings are linked to the quality of the environment.³³ Direct costs are measured in decreased productivity and health care costs. Indirect costs include decrease in quality of life (see *Work-related Asthma chapter* for more discussion).

School Air Quality

In the U.S. it is estimated that 56 million children and adults spend their days in elementary and secondary schools.³⁴ The quality of the school environment can affect the health, attendance, and performance of children and adults. Research from the Environmental Protection Agency (EPA) has shown that poor indoor air quality reduces ability in mental tasks that require concentration, calculation, or memory.³⁵ Refer to the *Asthma in Educational Settings chapter* for more discussion on asthma in schools.

26 Dilley J., Pizacani B., Macdonald S., Bardin J. (2005). *The Burden of Asthma in Washington State*. Olympia, WA: Washington State Department of Health. Pg: 106

27 DiFranza JR., Aligne CA., Weitzman M., (2003). Prenatal and Postnatal Environmental tobacco smoke Exposure and Children's Health. *Pediatrics*. Apr;113(4 Suppl):1007-15.

28 Dilley J., Pizacani B., Macdonald S., Bardin J. (2005). *The Burden of Asthma in Washington State*. Olympia, WA: Washington State Department of Health. Pg: 58

29 Ibid., pg: 104

30 Ibid., pg: 104

31 Ibid., pg: 119

32 Ibid., pg: 106

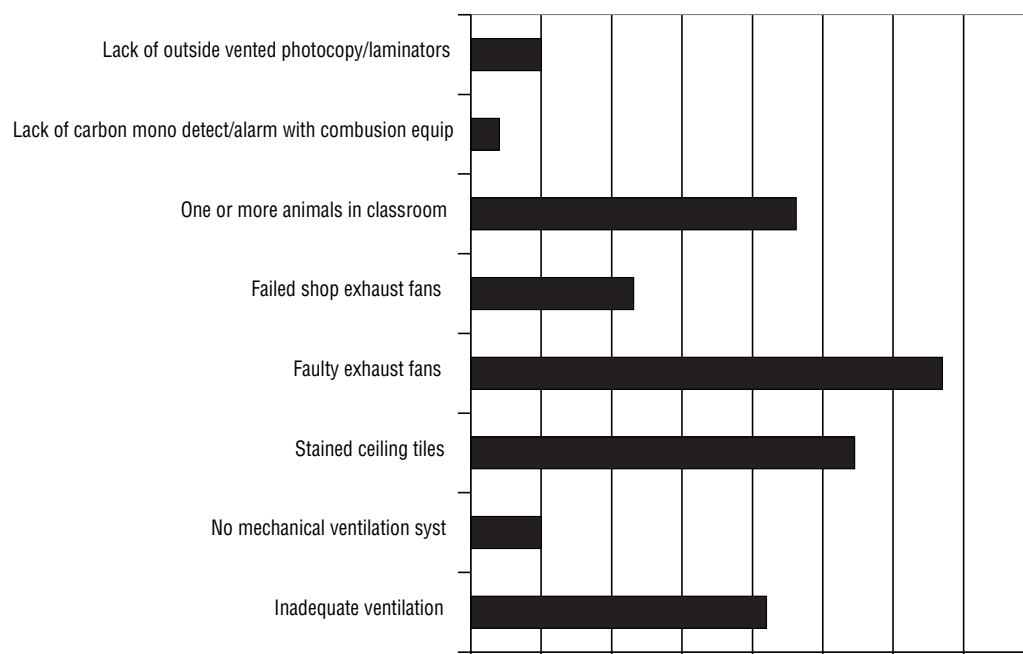
33 Fisk W., Rosenfeld A. (1997). *Improved Productivity and Health from Better Indoor Environments*, Center for Building Science Newsletter (now the Environmental Energy Technologies Newsletter), Lawrence Berkeley Labs, Summer, 5 <http://eetd.lbl.gov/cbs/newsletter/NL15/productivity.html>

34 Center for Disease Control, *National Health Interview Survey*, National Center for Health Statistics, 2002

35 U.S. Environmental Protection Agency, *Indoor Environments Division Office of Radiation and Indoor Air*. (2000). *Indoor Air Quality and Student Performance*. EPA 402-F-00-009

Asthma is the leading cause of school absenteeism due to a chronic illness, accounting for over 14 million missed school days per year in the U.S.³⁶ A major component of asthma management involves reducing the exposure to environmental asthma triggers through awareness, identification, and adoption of effective control measures in these school facilities. The EPA, in a 1999 General Accounting Office survey of schools reported that 43% of America's public schools reported at least one unsatisfactory environmental condition (indoor air quality, ventilation, noise, lighting, etc.) and that 25% of these schools reported unsatisfactory ventilation, and twenty percent reported unsatisfactory indoor air quality.³⁷

Figure 3: School Environmental Assessments, Washington and Idaho, 2000-2001



From 2000 to 2001, 3,801 classrooms were assessed at 156 schools located in Washington and Idaho by the Washington State Energy Program. The three most common environmental issues found in the schools were faulty exhaust fans, stained ceiling tiles and animals in the classroom.³⁸ Faulty exhaust fans and inadequate ventilation reduces the circulation of air, decreasing air quality. Stained ceiling tiles are an indication of water leaks that increase the risk of mold development. Since many people (with or without asthma) are allergic to animals and their dander/saliva, animals in the classroom cause an environmental hazard for them that can affect their health.

In Washington State, environmental assessments in the schools have been conducted principally through three programs; the Department of Health's Indoor Air Quality Program, the Northwest Clean Air Agency, and the Washington State University Energy Program utilizing tools such as the EPA's *Tools for Schools*. These programs are designed to work with schools to identify environmental issues and provide information on how to prevent and reduce these issues.

Policy Issues

Establishing a clear link between asthma and any specific environmental exposure is often difficult. People may be exposed to multiple agents in various places that can lead to asthma development or worsen asthma. Additionally, the impact of any given exposure on an individual can be modified by their behavior and genetic susceptibility. Despite the lack of specific causal links, health investigations have found a number of agents that are associated with asthma. To protect public health, it is therefore prudent to support policies that limit exposures in the environment associated with asthma.

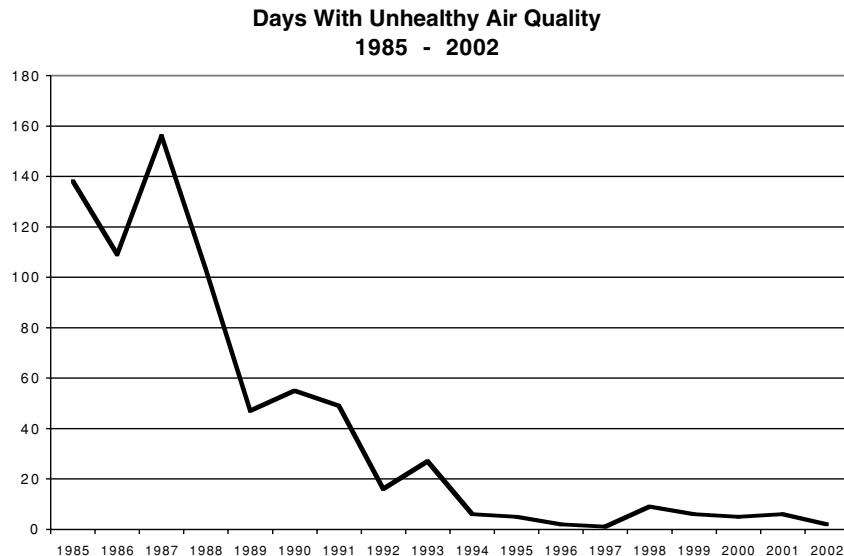
36 Environmental Protection Agency. (1999). *Indoor Air Quality Tools for Schools Fact Sheet*. EPA 402-C-99-002.

37 Environmental Protection Agency. (2000). *IAQ Tools for Schools – Managing Asthma in the School Environment*. EPA 402-K-00-003. 2000

38 Prill R., Blake D., Hales D. (2002). *School Indoor Air Quality Assessment and Program Implementation*. Proceedings, Indoor Air 2002, Monterey, CA

In Washington State, environmental policies have been effective in improving the overall quality of air, as demonstrated in the chart below. Washington air quality programs are housed at the Department of Ecology, the Department of Health and through 7 regional Air Quality Agencies.

Figure 4: Trends in 'Unhealthy Air Quality Days' in Washington State



Source: Washington State Department of Ecology. Air Quality Program. 2003

In September 2003, the governors of the three West Coast states committed to a regional greenhouse gas reduction initiative. As an initial step, the governors' staffs were directed to develop joint policy recommendations on five reduction strategies that will benefit from regional cooperation and action: hybrid vehicle procurement, reduced ports and highway diesel emissions, renewable energy, energy efficiency, and measurement and reporting.³⁹

In 2004, Governor Gary Locke directed all state government agencies to purchase only low emission vehicles for state travel. The executive order also directed all diesel-powered public transportation to convert to 2 % biodiesel in an extended effort to reduce vehicle emission and diesel exhaust. Washington now grants tax deferrals and exemptions for biodiesel fuel production and sales.

Over the last few years there have been several attempts in Washington to ban smoking in public places. The most controversial was in Pierce County (Tacoma). In December 2003, the Pierce County Board of Health passed a smoke-free resolution that prohibited smoking in public places, including restaurants, bars and taverns, casinos and card rooms, and bowling alleys. The ban took effect in 2004, but a Pierce County Superior Court judge threw it out just three weeks later. A state Court of Appeals commissioner reinstated the ban the following month, and then a three-judge panel of the same court tossed it out again last June. In 2005, the Washington State Supreme Court struck down the smoking ban stating that it was in conflict with the state's less restrictive *Clean Air Act*. A citizen initiative banning smoking in all places open to the public was passed in November 2005.

In 2005, several asthma supportive policies/actions were passed by the Washington Legislature or decreed by the Governor. They included:

Asthma Awareness Month

This year, Governor Christine Gregoire proclaimed May as Washington's first "Asthma Awareness Month" encouraging the citizens of Washington to participate in asthma prevention and management.

39 *Combating Global Warming*. Governor Gary Locke. Accessed on March 4, 2004: <http://www.digitalarchives.wa.gov/governorlocke/globalwarming/globalwarming2.htm>

Green Building Alternatives

Effective in July, all new and remodeled buildings are required to use green building alternatives. Washington State schools may use the Washington Sustainable Schools Protocol that includes incentives for schools to build high performance schools through green building practices.

Asthma Prevention and Management

Senate Bill 5841 was adopted, instituting a more comprehensive approach to asthma prevention and management which contained three components: 1) development of a state asthma plan, 2) coordination of state purchased health care to ensure best asthma practices are employed and 3) requirements that public school districts adopt policies permitting self-carry asthma/allergy medications at schools.

Mission Standards

House Bill 1397 was adopted requiring the state of Washington to begin implementing the California vehicle emission standards in July of 2005. Also in July, landlords in Washington will be required to notify tenants of possible health effects of mold in residential units.

Current Activities

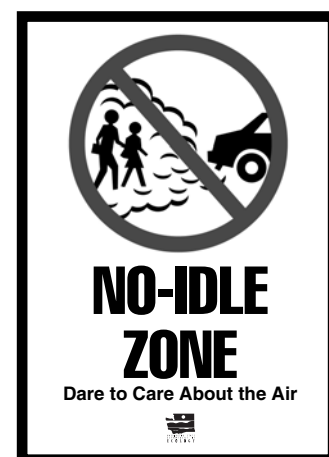
In 2003 the Tobacco Prevention and Control Program established the Secondhand Smoke Community Assistance Project to help local communities increase the number of smoke-free public places. The project team coordinates secondhand smoke reduction work in Washington and helps communities create policies to reduce exposure to secondhand smoke. The project also provides training, technical assistance, and resources. The Department of Health Tobacco program and the local Steps to a HealthierUS communities are working in partnership to encourage creation of policies that would reduce exposure to secondhand smoke and tobacco products.

Washington State is recognized nationally as a leader in promoting and adopting the EPA's Tools for Schools (TFS) program for improved indoor air quality and asthma management in schools. During the 5th Annual TFS Symposium in 2004, Washington received seven out of 22 national awards. Ephrata School District, Spokane East Valley School District, Kent School District, Spokane School District, the Washington State Department of Health, Washington State University Energy Program, and the Northwest Clean Air Agency received awards.

Winner of the EPA's 2005 Children's Environmental Health Excellence Award, the Master Home Environmentalist (MHE) program was developed in Washington State in 1992 and has been implemented in several cities in Washington. The program was designed to promote human health by increasing awareness of home environmental pollutants, allergens, and irritants and to encourage actions to reduce exposure. Program results indicate an 87% improvement with individual behaviors. The MHE program is currently available in King, Pierce, Thurston, Chelan-Douglas and Okanogan counties, and the Confederated Tribes of the Colville. Toppenish Asthma Project (1999-2000) and Childhood Asthma Project (2001-2004) at the Yakima Farm Workers Clinic used the fundamentals of MHE in evaluating all homes of children and adults with asthma.

In 2003, Washington State Legislature passed the *Clean School Bus Program* allocating \$5 million per year for five years to retrofit diesel school buses with air pollution control technology that reduces toxic diesel emissions. Washington has the largest statewide, state-funded, voluntary school bus retrofit program in the country.

Another project, funded in 2004 by the Department of Ecology in partnership with the Oregon Department of Environmental Quality and Washington and Oregon's local air agencies, created the *No Idle Zone - Dare to Care about the Air* program, designed to motivate bus drivers, parents and others to turn off their engines rather than idling vehicles at schools. In 2004, it was piloted at three local schools and showed a 56% reduction in idling in school pick-up/drop-off areas when compared to the control schools.



Environmental Health

Goal 1: Assure a safer and healthier environment for persons with asthma in Washington State

Objective AE.1

Through 2010, assess prevalence of exposures to environmental asthma triggers

Strategies

- Review, implement and update as needed the Washington State Asthma Surveillance Plan to assess prevalence of exposures
- Explore the feasibility of new methods of tracking asthma and environmental exposure prevalence

Objective AE.2

Through 2007, conduct a targeted needs assessment to identify the educational needs of the public regarding environmental asthma triggers

Strategies

- Review, implement and update as needed the Washington State Asthma Surveillance Plan to assess knowledge of the public regarding environmental asthma triggers

Objective AE.3

Through 2010, increase awareness among Washington State residents of the significant impact of indoor and outdoor environmental factors in the development and management of asthma

Strategies

- Develop/implement a population-based campaign to educate the public about indoor and outdoor environmental triggers (low-income, minority programs, homes, community centers, child care facilities, elder care, schools) to include secondhand smoke materials from the tobacco programs
- Partner with coalitions and other groups conducting outreach to health care providers, employers, and the general public to include information about indoor environmental asthma triggers
- Support Master Home Environmentalist series and other effective environmental assessment trainings statewide through increasing the number of statewide MHE volunteers and trained health department staff
- Support the use of Community Health Workers (e.g. Asthma Home Educators) to expand proven effective programs such as Healthy Homes I and II, Clean Air for Kids, and Childhood Asthma Project
- Support training opportunities for the public including child care staff, parents, and schools on reducing environmental asthma triggers using programs such as Tools for Schools, the Master Home Environmentalist and Secondhand smoke publications
- Support daily air quality index information availability to the general public
- Support that environmental health education is a planned component of public health programs ⁴⁰

Objective AE.4

Through 2010, raise awareness among housing and building professionals including architects, building engineers, construction contractors, building owners/managers and maintenance staff about exposures in the environment linked to the development or worsening of asthma

40 Washington State Department of Health. (2000). *Standards for Public Health*. www.doh.wa.gov/standards

Strategies

- Develop/identify trainings and materials for housing professionals on environmental triggers of asthma
- Support education of architects, building engineers, contractors, builders, building managers, maintenance staff, and other housing professionals about the health effects of building technologies such as the need for adequate ventilation, off-gassing from building materials, and the importance of proper maintenance of building structures to prevent moisture intrusion, accumulation of dust and adequate ventilation
- Support education on “green cleaning” and integrated pest management practices
- Develop/identify incentive-based strategies for building owners/managers to create and maintain healthier living environments for residential/commercial tenants

Objective AE.5

Through 2010, decrease exposures in the indoor (car, home, schools, child care, etc.) and outdoor environment that can worsen asthma or lead to asthma development

Strategies

- Review the information gathered from the Department of Health Environmental Health Programs Office of Assessments school asthma pilot program to determine which intervention(s) are most effective
- Partner with child care agencies to provide education materials to child care providers and parents on reducing environmental triggers
- Support campaigns to implement proven strategies to reduce exposures in the environment linked to development or worsening of asthma in various settings including homes, schools, child care facilities, and community spaces
- Support opportunities for dialog with Department of Health and Human Services, Medical Assistance Program and other public payers of health care to provide coverage of Master Home Environmentalist home-based environmental assessment and education for families of children and adults
- Develop/provide model policies on addressing environmental triggers for asthma in schools, child care facilities and community programs (e.g., YMCA)
- Support school-based environmental education, assessments, and policy development and implementation in Washington schools through the utilization of evidence-based programs (such as the Asthma-Friendly Schools initiative or Tools for Schools)
- Support and encourage programs that reduce vehicle emission throughout Washington State. Use targeted interventions such as anti-idling campaigns at schools, clean vehicle standards, incentives for clean vehicles and fuels (including low sulfur fuels)
- Support policies/programs that address diesel-reduction (such as bus and heavy vehicle retrofitting, alternative fuels public transportation, etc.)
- Support evidence-based program trainings (e.g., Master Home Environmentalist) to reduce or eliminate indoor and outdoor asthma triggers for individuals with asthma, their families and the general public



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